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ABSTRACT

Educational problems underlie the crisis in the high-tech workplace. Insufficient expenditures for workplace education result in low productivity. Technology requires a skilled work force; the chief competitive advantage for a nation will be its skilled workers. Workplace literacy has been a half-hearted effort. Investment of billions by U.S. business in new state-of-the-art technology will not increase productivity unless parallel investments are made in employee training. Basic literacy is a 20th-century phenomenon driven by the needs of a more urban, industrial economy. The work force literacy gap is fueled by high school graduates who are functionally illiterate for basic entry-level positions and by increased numbers of poorly educated minorities and immigrants in the labor force. Some businesses have creatively responded to the crisis with effective, high-quality work force education initiatives. One such company is the suburban Chicago plant of Clorox, which uses the Individualized Instructional Program mastery-learning tutorial model. Another part of the work force literacy effort is taking place in the public schools. Business is mobilizing to help the schools prepare future employees through creative partnerships. Significant work force education trends that will take the nation into the next century include every student's completion of high school, increased financial commitment to public education, higher achievement standards, and businesses' investment in training and development. (Contains 20 references.) (YLB)

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FASTBACK

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The Need for Work Force Education

Edward E. Gordon

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The Need for Work Force Education

by
Edward E. Gordon

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The chapter sponsors this fastback in honor of its past presidents, who undertook the responsibilities of leadership and who continue to inspire members to assume leadership roles.

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Introduction

America is in a race between the education of its citizens and the rapidly advancing technology of the workplace. Many in education, business, labor, and government think America is losing the race. The introduction of complex computer technology and other high-tech innovations into every office and plant has left a staggering number of younger and older workers in danger of becoming the under-educated "new peasants" of the Information Age.

As we approach the 21st century, the nation stands at an economic crossroads. One road leads to industrial stagnation and the loss of our competitive position in the international marketplace. The other leads to the fundamental restructuring now under way in some sectors of business and education in preparation for the next millennium. If we choose the latter, then we must begin to institute Work Force Education throughout the workplace for undereducated plant workers, office staff, and even many managers.

We cannot continue as an economic superpower with our current undereducated work force. Workers at all levels lack requisite job-related skills and must be closely supervised. Many leave errors uncorrected and ignore mistakes, which results in lower productivity and poor quality products. They lack basic problem-solving abilities, that so-called "Yankee Ingenuity" of another era that made America great.

Did America win the Cold War only to lose the 21st century's international economic race? Numerous business, education, and political leaders ignore the reality that the world economic community is engaged in a new competitive strategy that is beginning to leave America far behind. One of the major components of this strategy is our foreign competitors' investment in better education and training for all their citizens, thus giving them a competitive advantage in the workplace.

Our schools must offer greater program diversity to prepare students for the world of work. Similarly, business must make a commitment to continuous training for all employees to meet changing job requirements. A commitment to quality education, whether in the corporate classroom or the local school, will determine America's future standard of living and its competitive position in the world economy.

In this fastback I shall first review the central educational problems underlying the crisis in the high-tech workplace. This is followed by a brief examination of the history of workplace literacy programs, including why many have been ineffective because they largely ignore basic principles of adult education. I shall also review the current research that supports successful Work Force Education programs. Finally, I shall identify the significant Work Force Education trends that will take us into the next century.

The Need for Work Force Education

"I want a good-paying factory job. I love factory work; but right now nothing is opening up, and I got nothing to do." So complains Ken, who is looking for the kind of blue-collar factory work he once had. "The applicants that we get are ridiculous. They can't read, they can't write. They can't do fractions or figure out how many inches there are in a ruler." So comments the president of the Illinois Manufacturers Association, referring to people like Ken. Ken once got by, but he no longer fits the job equation of the 1990s. Too many American workers of all ages cannot read, write, or use math at the higher levels now needed for most jobs.

This workplace literacy issue has developed over the past 20 years as U.S. business and industry introduced increasingly complex computer technology and other high-tech equipment into almost every office and plant. Since the introduction of the personal computer in the early Seventies, it has become so pervasive that it is hard to find even a small business without at least one computer. Yet a staggering number of older and younger U.S. workers have failed to make the transition to the new job requirements this technology demands.

As a result, major sectors of business have been unable either to introduce or fully utilize this new technology because of poorly educated employees. This translates into lower productivity and seriously reduces America's capacity to compete internationally. European manufacturers of high-tech machine tools have told me on several

occasions that some of their products are no longer marketed in the U.S., because they say our typical worker is too poorly educated to operate their latest equipment. Many workers cannot comprehend advanced technical manuals or perform applied math operations needed for this new equipment. Clearly, America's role as a competitor in the international marketplace is not only a question of who makes the best products, but more importantly, who has the best-educated and best-skilled work force.

Since World War II the United States has watched as Germany, with one-quarter of our population, almost equaled us in exports. Japan has become the world leader in personal electronic products and is now the home of the world's largest automotive company, Toyota. The last two decades have witnessed the rise of former Third World outposts, such as Singapore, Taiwan, and Korea, to premier world exporters.

Investment in Education: The Competitive Edge

Much of our foreign competitors' success has been built on significant expenditures for employee training by individual companies. Investment in training now averages five to six percent in the typical budget for Japanese and northern European companies. This compares to the U.S. average of one to two percent.

The lack of adequate education in the work force results in lower productivity. In 1991 the U.S. Department of Commerce attributed a $300 billion annual productivity loss to the undereducated worker. During the past two decades, productivity growth has slowed to a crawl. It now takes nearly three years to achieve the same growth in productivity that we used to achieve in one year.

Technology creates competitive advantages, but it requires a skilled work force to operate high-tech equipment. The chief competitive advantage for any nation in the 21st century will be its skilled work force.

The route to success in the international marketplace requires America to become the best producer of goods and services at the lowest cost. This will require improved education of the bottom 50% of our work force. Without a better educated work force, the new high-tech processes cannot be used.

Workplace Literacy: A New/Old Problem

Adult literacy is not a new problem. For many years adult basic literacy programs have been conducted by such organizations as the Literacy Volunteers of America, Laubach Literacy Action, Project Literacy United States, and many others. In the business world training in basic literacy skills has been a half-hearted effort.

Prior to 1980, few companies saw the need for basic skills training for their workers and were reluctant to fund in-house literacy training programs. By 1984 a few companies were beginning to introduce remedial programs using computer-assisted instruction as well as traditional classroom instruction. These efforts were supplemented by community college GED classes and local adult literacy programs using volunteer tutors.

Unfortunately, the majority of these programs experience an average student dropout rate of 50%. Why? Many adult students see little relevance between the literacy training they receive and their day-to-day job requirements. Basic literacy programs are often staffed by volunteers who receive only minimal training. Instructional materials are not diagnostic to ascertain potential learning blocks, or are inappropriate to adult interests. Most teaching is lock-step rather than individualized, using smaller tutorial groups that can better address an undereducated adult's personal learning problems. Limiting our efforts to basic skills or basic literacy training is an insufficient response if the U.S. is to remain globally competitive. What America needs is Work Force Education that encompasses 21st century educational and training standards.

Work Force Education Defined

Work Force Education encompasses much more than acquiring better reading, writing, and math skills. It calls for a much broader training that empowers workers to become more productive and innovative. The majority of new jobs will require some post-secondary education. Many of these jobs are clustered in such industries as telecommunications, computer systems, audio and video consumer electronics, semiconductors, precision machinery and automation, aerospace, advanced materials technology in ceramics and special alloys, chemicals and pharmaceuticals, health care, and pollution control. Technology is the driving force in all these industries.

The crux of the issue, however, is the manner in which American business spends its money. Investing billions in new state-of-the-art technology will not increase productivity unless parallel investments are made in employee training. Investments in human resources must be continuous because the pace of job obsolescence is quickening.

In 1991 the American Society for Training and Development reported a record expenditure of $40 billion for U.S. company training programs. However, the vast majority of these funds were allocated for management training and development. Less than 2% of all training expenditures were invested in assisting the undereducated worker. Instead, most businesses have tried to dumb-down jobs, introduce more robotics or computer-assisted manufacturing, rewrite technical manuals below the fourth-grade level (some even rely heavily on pictures rather than words to train workers).

U.S. corporations continue to move overseas seeking cheaper labor and sometimes finding better technically trained persons at lower wages. Examples abound: Borg-Warner will build a 1,700-job transmission facility in China. Motorola will operate a new $20 million cellular car phone plant in China. Motorola also has selected Scotland as the site for a new research facility for its European operations. Smith-Corona elected to move its last U.S. manufacturing facility to Mexico, eliminating 775 jobs in New York State. The

company already employs about 1,300 workers in Singapore and Indonesia. America's auto, aerospace, and computer chip manufacturers are currently fighting not just for market share but for their very existence.

Some political leaders have focused on trade protection as a means of restoring a favorable trade balance. This policy might very well shove the world economy into a protectionist stance, leading to serious political friction among the U.S. and its major trading partners.

Despite these developments, in 1991 the U.S. was still the world's largest exporter, selling a record $422 billion worth of goods and $145 billion in services abroad. Each billion dollars of exported merchandise generates 20,000 jobs. One-third of the country's economic growth in the past five years has flowed from this surge in foreign sales. As Bill Frenzel of the Brookings Institute states, "The focus of our policy must be on making domestic firms competitive, not on limiting competition from the world's technology driver." Nevertheless, low-skill jobs will continue to leave the U.S. under any circumstances. Our challenge is to re-educate workers so that high-skill, high-pay jobs remain close to home.

Lack of Support for Training the Undereducated Worker

Why has senior management ignored investment in Work Force Education as a strategy for making our industries more competitive? The general view is that undereducated workers are a social problem to be addressed through school reform, not within the business community. Most executives believe that their undereducated workers cannot be retrained for 21st-century technology. A 1990 study by the Commission on the Skills of the American Workforce found that only 10% percent of businesses plan to use employee training as a way to to increase productivity. Many company in-house programs have been largely limited to basic skill/GED classes or computer-based literacy training. Because of a "quick-fix" mind-set, the typical management view is that it would be far too costly for the years of formal

schooling that would be needed to bring America's undereducated workers up to a level to compete effectively in the international marketplace. These arguments create a corporate culture crisis of the first magnitude, which could translate into the decline of the American economic system as we now know it.

What we need to do is show business leaders that Work Force Education produces results that: 1) give a better long-term return on investment through improved worker productivity than does moving the business overseas, and that 2) training systems exist today that can be adapted for any business that both shorten the employee's learning time and lead to better skill retention for job application.

In the next two chapters we first re-examine the past history of adult literacy programs in America and then review case studies showing how some businesses have creatively responded to the crisis with effective, high-quality Work Force Education initiatives for workers at all levels.

A Concise History of Literacy in America

Most readers of this fastback take for granted their ability to read, write, and use mathematics in daily life. This has not always been the case. Basic literacy is a 20th-century phenomenon driven by the needs of a more urban, industrial America.

The Changing Meaning of Literacy

The standards for what it means to be literate have changed over time. Prior the the advent of the modern census, historians used the ability to sign documents, such as church registers, civil court records, and other legal documents, as a standard of literacy. Using these sources as a standard of literacy, historians made some estimates of what proportion of the population was literate.

Critics of this method point out that knowing how to write one's signature does not mean that one could read and write. On the other hand, women were not allowed to sign legal documents in those times, but some undoubtedly could read and write. Keeping all these limitations in mind, it is estimated that male literacy in New England, based on signatures on wills, was 60% by 1650. Using the same basis, literacy rose during the 18th century from 70% in 1705 to 90% by 1795. In 1840 the U.S. Census Bureau began asking heads of families the number of family members over age 20 who had the ability to read and write. However, it was not until 1870 that the Census Bureau

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gathered literacy information on children between the ages of 10 and 19. In 1870, the U.S. illiteracy rate, by the standards used then, was 20%. This rate declined steadily with each census (1900–10.7%, 1920–6%, 1940–2.9%) to the current level of approximately 2% of the entire population. This phenomenon of declining illiteracy in American society is directly related to the emergence of our free public school system, which was charged with preparing workers for a mass-production, urban society.

An alliance of educators, social reformers, and union and business leaders agreed that public education was essential to support the transformation of America during the period 1890-1918, a time of unprecedented social change and economic expansion. Increasing the level of literacy contributed to the establishment and growth of the American middle class. It created better occupations at higher pay. By 1918 all 48 states had mandated compulsory school attendance; and universal literacy had become a cornerstone for modernization, democracy, and a prospering consumer economy.

Times have changed. The definitions of literacy from 50 or 60 years ago are no longer adequate for today and the 21st century that is almost upon us. Today we speak of "functional literacy," which is a much higher standard of literacy needed for our high-tech society.

Functional literacy for the 1990s means the ability to read, write, or compute at a level to accomplish the kinds of basic everyday tasks found at home or on the job. If it is defined in terms of the ability to read simple texts and street signs, then only about 27 million American adults are labeled "functionally illiterate." Place the standard higher, say the ability to read a local newspaper or a digest magazine, then about 45 million would lack this standard of literacy. However, if we define functional literacy as the ability to read a technical manual, computer software instructions, *Time* magazine, or to complete an IRS short-form tax return, then we might classify over 80 million American workers as functional illiterates! And by the year 2000, about 75% to 80% of these will still be in the work force.

But what about the next generation of workers seeking their first job? The International Association for Evaluation of Educational Achievement estimates that 29% of America's high school students drop out before graduation. Of these, 20% are considered functionally illiterate for basic entry-level positions. Even more disturbing are studies of current high school graduates that indicate they are unable to complete complex tasks or use information above a literal, concrete level. Only about 40% of today's high school graduates are found to be successful at these activities.

What also fuels this work force literacy gap is the substantial demographic shift in the U.S. labor force as more minorities and immigrants enter the labor pool. Much of this new labor pool is now poorly educated or uneducated.

Just as we are now facing a decline in functional literacy among many entry-level workers, the majority of new jobs will require some postsecondary education. By the year 2000 the U.S. Department of Labor estimates that only 27% of all new jobs will fall into the low-skill category. The consensus among business, government, and education leaders is that functioning at the 12th-grade level must become our national standard if we are to remain competitive. These same leaders see too many American workers performing below this standard.

Moreover, our Work Force Education problems are not limited to only the 30% of the unskilled worker population. At least 29% of semi-skilled and 11% of managerial and technical employees are undereducated for their present or future jobs. As William Kolberg, President of the National Alliance of Business, sees it, "We are on a collision course with the reality that America is developing a second-class workforce." The National Center on Education and the Economy estimates that if America's productivity continues to decline, the top 30% of the U.S. work force will grow richer and the bottom 70% will become increasingly poorer, or the entire population will experience a much lower standard of living over the long term.

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Harvard economist Michael Porter in his book, *The Competitive Advantage of Nations*, argues that training/education is the single greatest mechanism for upgrading any business and increasing America's international competitiveness. Improvement in the general education abilities of all employees is essential for the survival of the American economic system. Unless the work force literacy gap is closed, the U.S. will be unable to compete in the world economic arena.

The literacy gap also is a threat to American democracy. This is reflected in the millions of adults who fail to exercise their right to vote. These are the same adults who become easy targets for those seeking to manipulate public opinion through the electronic media by blaming others for society's problems.

Americans are not less literate today than they were in 1900. However, our old "yardstick" for measuring literacy has been forever replaced by much higher standards in education and technical skills. A crisis exists today because the need for increased literacy of a proportionally larger group of undereducated Americans has outpaced the public school system's ability to educate or train.

In the next chapter we will examine what is being done by companies both large and small across the United States to meet the work force literacy challenge.

Corporate Literacy Programs in Action

Business training classes are in session all across America. The American Society for Training and Development (ASTD) estimated that in 1991 more than $40 billion was invested in employee education. The Carnegie Foundation estimated that eight million workers attend these corporate classrooms. Unfortunately, only about $500 million of these training expenditures are now allocated to Work Force Education.

Most of the expenditures (90%) for corporate training and development are made by only five percent of American businesses. These tend to be big companies. In a 1992 report on the state of small business training, the Southport Institute for Policy Analysis found that only three to five percent of firms having 500 employees or fewer have Work Force Education programs in operation. These programs served only 200,000 to 300,000 workers.

Many major corporations now offer employee education programs in reading, writing, study skills, English as a second language, mathematics, blueprint reading, grammar, technical writing, interpersonal communications, as well as many other areas. The emphasis is usually on the application of new skills to present or future job needs.

Most of these programs do not address illiteracy per se, but rather are intended for the undereducated employee who may already have a high school or even a college diploma. These individuals cannot

work productively in their present jobs without significant additional training in technical skills, interpersonal skills, and problem solving.

Work Force Education programs are now being sponsored by such corporations as Polaroid, Motorola, Allstate, Hewlett-Packard, Quaker Oats, Inland Steel, General Motors, Ford, Chrysler (in cooperation with the United Auto Workers), and the International Ladies Garment Workers Union, among others. However, few large corporations offer such programs at every plant or office location. Most local programs are funded by regional, state, or federal literacy grants. Very little financial support comes from their own training and development budgets. Work Force Education remains the poor stepchild of business.

In addition, many companies are offering basic literacy training for their employees through programs conducted by Laubach Literacy Action and Literacy Volunteers of America. These non-profit organizations use thousands of volunteers across America to provide basic literacy training either by one-on-one instruction or in small tutorial groups. They publish their own materials and offer training for the volunteers. Some on-site company programs use materials adapted for the workplace.

One limitation of these programs is the absence of diagnostic procedures to determine learning disabilities, such as dyslexia. Another is that they are dependent on volunteers, whose initial training is often minimal. And few of these programs have the benefit of ongoing training or consultant help from professional adult educators and training specialists. Such consultant help is desperately needed by most community-based, non-profit programs to improve instructional quality.

The federal response to the undereducated worker began in the 1960s with the Adult Education Act (1964). It funded Adult Basic Education programs through the states and provided both high school completion programs (GED) and community-based literacy education.

Basic occupational training and remedial education also is offered through the Job Corp at 107 residential centers in 42 states. These

training centers prepare disadvantaged youth, ages 16 to 21, for real-world employment. By 1991 there were 12 separate federal agencies dispensing $345 million to 78 programs, many related to Work Force Education.

The National Literacy Act (1991) established a National Institute for Literacy to conduct research and centralize the activities of all federal literacy programs. One of these initiatives is the National Workplace Literacy Program, which has funded demonstration projects involving partnerships between business, industry, labor, and educational institutions to train adult workers who lack basic skills needed to perform their jobs.

Thus far these federal literacy programs and the volunteer community-based programs have been the primary vehicles for serving the increasing demands from business for Work Force Education. Yet, even after almost 30 years of effort, less than one-half of one percent of undereducated adult workers are now receiving educational assistance. Why? These programs are all severely underfunded. And with the enormous federal deficit, the prospect of increased public funding is problematical.

Moreover, it is doubtful whether larger volunteer-based efforts are the most cost-effective or expeditious way for business to achieve significantly higher employee productivity over the long term. Volunteer programs usually cannot cope with the different educational needs found in the typical workplace. At best, these efforts may be able to mobilize employee volunteer tutors for company-sponsored training. This could be one component of a multi-pronged approach to Work Force Education. In the final analysis, large-scale Work Force Education programs will not occur without direct investment in training and development by individual companies.

Recent proposals to increase public funding for Work Force Education include:

1. Expanding apprenticeship and skills training for high school dropouts through tax increases, including taxing businesses that do not presently offer employee training.

2. Expanding the Job Corp and offering more trade school assistance to individuals. Funding sources remain indefinite.
3. Offering all companies tax credits for investing in training human capital – their employees. These tax credits would be aimed at companies of 500 employees or fewer and would offer greater incentives for training entry-level production or support workers rather than managers.

Computer-Based Training

Computer-based training (CBT) applications have become a major feature of some company-sponsored Work Force Education programs. The availability of new software appropriate for adult learners makes CBT an important component of a total training program.

Interactive videodisc (IVD) also expands the application of CBT training with its combination of audio and still and motion pictures. Although IVD programs offer many sophisticated audio/graphics, few are designed for specific workplace applications and are not easily adaptable to job-specific content. Few make any provision for learning disabilities. Most software seems more appropriate for adults already functioning at higher skill levels.

Books and Paper/Pencil Programs

The primary materials used in Work Force Education programs tend to be print, including workbooks and "paper and pencil" activities. Several publishers offer such materials. One such program is Simon & Schuster's *Literacy at Work: The Workbook for Program Developers*. This program features a train-the-trainer approach and is designed to help instructional personnel adapt generic written materials for specific workplace applications. This approach appeals to small and medium-size companies since the investment is less than purchasing computer hardware and software. Print materials also can be expanded, adapted, and updated more easily.

Many factors go into the selection of materials and approaches for Work Force Education. Variety is needed to serve groups of workers with different skill levels and different needs. Both research and the experience of trainers confirm that Work Force Education training methods in descending order of effectiveness are:

1. Mastery Learning (particularly a small group tutorial model).
2. Cross-Training (peer tutoring).
3. Computer-Based Training (for higher-skilled adults).
4. Programmed Learning (for independent learners).
5. Traditional Classroom Instruction.

Common Problems in Corporate Training Programs

Many corporate training programs fail because they subject adults to the same conditions that caused them to fail in school. Typically, classes are too large, making it difficult to individualize instruction. Little effort is made to adapt commercially produced materials or to modify teaching methods in order to address specific worker learning problems. Many of these adults bring to the workplace a history of undiagnosed learning problems.

The fallacy of too many corporate Work Force Education programs is assuming that the employee already knows "how to learn" new skills and then to apply them on the job. To be effective, Work Force Education programs must first diagnose learning strengths and weaknesses. This means asking specific questions and gathering anecdotal information about each adult learner. From this information will emerge a picture of the adult's learning needs, interests, and personal goals. The instructor then uses this information to adapt instructional content and teaching methods to show the adult how to learn and apply what has been learned.

A Case Study in Work Force Education

Since 1968 the author, working with other educators, has provided Work Force Education programs for factory workers, office support staff, managers, and even professionals – all of whom lacked a variety of skills needed for their jobs. They worked in manufacturing, retailing, health care, petrochemicals, law firms, trade unions, accounting firms, and the hospitality industry, among others. A summary of our work and research is reported in *Closing the Literacy Gap in American Business* (Greenwood, 1991) The following case study is taken from this source.

The suburban Chicago plant of Clorox employs approximately 100 workers and managers. They assemble from raw materials a finished product ready for distribution to regional supermarkets. When Clorox management decided to introduce new computer-driven manufacturing/assembly equipment, they knew that it would require at least ninth- to twelfth-grade reading skills for data entry and for understanding training manuals and computer software.

As is true of many U.S. manufacturers, Clorox's work force included many who never attained ninth- to twelfth-grade skill levels. Yet these same adults were good workers. Many had been with the company for 10, 15, even 20 years. Management realized that it was far better to retain these loyal employees and retrain them than it was to seek new hires from the local labor pool. A Clorox manager justified this retraining program using that oil filter commercial where the mechanic says, "You can pay me now or you can pay me later. Either way, you're going to pay."

Clorox introduced its Work Force Education program on a voluntary basis, beginning with several worker-orientation sessions announcing the availability of classes and their content and answering employee questions. Clorox paid for the entire program. Employees attended on-site classes before or after their work shift. A typical class was composed of five employees. They attended two-hour classes twice each week for a period of 10 weeks, totaling 40 hours of tutoring

per training module. An Individualized Instructional Program (IIP) was used with each employee, first to diagnose individual learning problems and then to tutor specific skills used on the job.

Some employees had significant learning disabilities that no doubt accounted for their lack of success when in school. Almost without exception, once their learning disabilities were diagnosed, these employees were capable of rapid skill growth and long-term retention of new information. Overall, worker achievement averaged 12 months of skill growth over the 10-week training period, with an 80% retention rate six months after their training. Results did vary, with some advancing only six months and others by as much as two years per module. Such variations of individual learning rates were attributed to the degree of personal motivation, general aptitude, and in some cases, learning disabilities.

The good news for U.S. business is that the kind of Work Force Education programs instituted at Clorox can be replicated in any business large or small, with a good return on investment through increased productivity. And there are other work force benefits. One employee reported how happy he was because he could now read the daily newspaper. For more than 15 years, he had come to work every day with a rolled up newspaper in his pocket. At break time and lunch he "read" his newspaper like everyone else, even though he understood very few words. Now that he can actually read his newspaper, his motivation for learning and his belief in himself and his employer are at an all-time high.

Supervisors were regularly surveyed at the conclusion of each 10-week module. They provided data showing that production errors dropped, employees began applying for more complex jobs, employee problem-solving/troubleshooting skills increased, and personal job motivation improved.

The Clorox program was presented the "Lift Award" by the U.S. Secretary of Labor to recognize a company's effort to enhance the quality of work life for its employees. Nevertheless, Clorox manage-

ment recognized that their employee training/education program was a long-term effort with no quick fixes.

The Individualized Instructional Program (IIP) used at Clorox is a mastery-learning tutorial model. The IIP curriculum scripts are specially designed for use by a trainer working in an administrative team. They feature precise diagnosis, rapid learning, verification of results, adaptation of work-related/personal-interest materials for instructional content, pre/post program assessment, improved long-term retention, and enhanced skills appropriate for new tasks or job requirements. Each IIP, with its associated written and reporting materials, is designed to help the trainer follow a sequential presentation with an individual or a group of up to five employees, with constant feedback to employees.

The IIP mastery-learning tutorial model described above avoids many of the pitfalls of traditional adult education and training programs. It carefully accounts for individual strengths and weaknesses. It easily adapts both content (skills) and tutorial procedures (methods) to each person's unique learning profile. The 10-week training module gives the adult enough time to learn and apply new skills.

The individualized tutorial Work Force Education model can be easily adapted for different employee groups in a company. The author has used the model for training programs is such companies as:

Marriott Inns: English as a second language for housekeepers
Morton International: grammar for secretaries
U.S. Gypsum: writing for managers
Continental Can: technical writing for engineers
Indramat: German for U.S. engineers
Motorola: French for marketers
Nutra Sweet: Spanish and Portuguese for South American marketers

In each of these programs, regardless of the educational level of the employees, the most effective training format was one based on

job skills they now need, or will need, to do their job. At the outset of the training, workers are informed that their classes will help them progress in their careers. Training materials are developed right from the employee's job, giving concrete examples of what skills need to be mastered. Employees are encouraged to try out newly acquired skills immediately on the job and to report back to their trainer about what worked and what didn't.

In some instances personal interests (hobbies) and skills needed in daily life (filling out a job application, completing an income tax return, writing a personal letter) are incorporated into the training program. Supplementing the training in this manner helps to maintain interest and personal motivation.

Work Force Education programs are needed at many levels in business and industry – and on a continuous basis since job obsolescence will speed up in the 1990s and beyond. Business is just beginning to realize that retraining efforts are an investment in human resources, which will pay significant dividends far in excess of what it costs to provide them.

At the most basic level, small-group tutorials will be needed to diagnose adult learning problems and establish a firm foundation for employees in reading, writing, and math. Even one-on-one tutoring will be needed for maximum individual learning beyond the basics. Classroom instruction will be needed for employees who have learned "how to learn" and can apply newly acquired skills to their jobs. CBT and IVD will be used by the classroom teacher to supplement instruction and for employees who are capable of independent learning. With a multi-level program matched to the assessed needs of individual employees, every company, large or small, can close their Work Force Education gap.

Another part of the work force literacy effort is what is taking place in the public schools. In the next chapter we examine how business is mobilizing to help the schools prepare future employees.

Work Force Education and School Reform

Henry Rowan quietly made a fortune at his Inductotherm Industries, a manufacturer of thermal induction furnaces. He lost his anonymity in 1992 when he donated $100 million to nearby Glassboro State College, one of New Jersey's state colleges located among the farms in the southern part of the state. (Not surprisingly, its name has been changed to Rowan College.) This was the largest individual gift ever made to a higher education institution in America. What was his motive?

Rowan is a hands-on manager. While walking through his plant, he noticed an employee struggling to solve a simple math problem. When asked if he could help, Rowan was shocked to discover the worker could not add three fractions to determine to the length of a pipe fitting.

"Adding fractions is about a fifth-grade skill, yet here's a man who spent 15 minutes trying to solve this problem, and that is 15 minutes of productive time that he lost," Rowan said. "I don't think I have the answers, but we have lots of problems with our school system, and we'd all better have an interest in it or we're all in trouble."

The "trouble" Rowan refers to is the gap that exists between the education students now receive and the needs of a sophisticated, high-tech workplace for the 21st century. While U.S. schools today are perhaps providing a 21st-century education for about 20% to 25% of our students, the majority are still being prepared for a mass produc-

tion, industrial era that is fast fading away. As a result, these students are moving into the work force without the requisite job-related skills. They constantly need to interrupt their work and ask for assistance from others, thus slowing down production. They make errors and ignore mistakes that affect product quality. They lack application and problem-solving skills needed for a high-tech economy.

Business has come to realize that closing the Work Force Education gap will not be solved just through better in-house company training programs. There also must be much better preparation of students in our schools. In order to remain a world-class economic power, business and the schools must work together in reforming our schools to prepare students to become productive members of the work force.

The good news is the emergence of bold leadership and broad popular support for school reforms that will have a major impact on preparing workers for the 21st century. Following are just a few innovative programs that hold great promise as models of Work Force Education:

- In 1992 Sears established an apprenticeship program with the DuPage (Illinois) Area Occupational Education System. It links Sears appliance service centers with innovative high school academic/technology classes. Sears has invested $3 million in the program and is cooperating in developing the curriculum. This ensures that the program content is up to date and on target. On graduating from the program, students may apply for openings at Sears appliance service center. Or they may decide to go to work for Maytag!
- In Boston, high school juniors spend part of the school day working in local hospitals. This work experience prepares them to become surgical technicians, medical secretaries, and to enter other health care occupations.
- In Tulsa, Oklahoma, students are enrolled in a regular high school program while also pursuing special certification for jobs in the local metalworking industry.

• In Detroit, graduates of inner-city high schools are working in an apprenticeship program where they upgrade their verbal and math skills and simultaneously receive training in operating advanced machine tools used in the local car-parts industry.

• The Jersey City school system, in cooperation with Merrill Lynch, has established the Financial Industry Readiness Skills Training Program (F.I.R.S.T.). Serving inner-city minority youth, the program includes special courses in an alternative high school and an internship that prepares them for jobs in the financial services industry.

The students in these programs make up the "forgotten half" of those aged 16 to 24 – some 20 million who do not go on to college. These new apprenticeship programs feature a combination of school/work experiences that prepare young people for entry-level positions in business and industry. At the same time, we are seeing a flurry of legislation at both the state and federal levels promoting school-to-work programs for all levels of commerce and industry.

Vigorous partnerships between the schools and business are part of the solution to the Work Force Education gap, but significant improvement will take time. The schools cannot by themselves restore America's competitive position in the world economy. Of equal importance is corporate-sponsored employee education and training programs.

The Future of Work Force Education

America has a rich education legacy, which contributed to its preeminence as a world economic leader throughout most of the 20th century. However, if we are to maintain that leadership in the 21st century, we can no longer rest on our laurels.

All students must complete at least the 12th grade with strong skills. Business must provide training programs for specific entry-level jobs as well as continuing education programs for all employees to keep them up to date. This means investing in training and development at the same level as Western Europe and Japan.

If we expect the schools to produce better overall students, we must link quality to wages. We must pay teachers more and expect better results. And higher teaching salaries must be linked to increased time in the classroom. Students in Japan attend school about 240 days a year, in Germany about 210. The 180-day school year must be consigned to the nostalgia of its 19th-century, harvest-schedule origins. More time is needed in school if U.S. students are to learn what a modern society requires to maintain prosperity for all its citizens. This means we must spend more on elementary/secondary education.

Increasing our financial commitment to public education must be coupled with higher achievement standards. National standards must be established for all curriculum areas and for high school graduation. Some schools may wish to surpass these standards. We need to double the number of students attaining 12th-grade graduation stan-

dards by the year 2000. By that date, according to the U.S. Department of Commerce, at least 80% of all jobs will require 12th-grade skill levels or above.

New school-to-work curricula, school-business partnerships, and increased funds are insufficient by themselves to guarantee a competitive work force. Companies will still have to deal with skill deficiencies among their workers. And CEOs will have to abandon the "buck passing" attitude of blaming the schools or the employees themselves for poor work skills. This attitude is captured in poem below.

Who's to Blame

The business executive says, "How can I win this global fight,
When the college sends me a graduate who can't read or write?"
The college professor says, "Such wrong in a student is a shame,
Lack of preparation in high school is to blame."
Says the high school teacher, "Good heavens, that boy's a fool,
The fault, of course, is with the grammar school."
The grammar school teacher says, "From such stupidity may I be spared,
They sent him to me so unprepared."
The primary teacher says, "The kindergarten blockheads all,
That kind of preparation is worse than none at all."
The kindergarten teacher says, "Such lack of training never did I see,
What kind of mother must that woman be?"
The mother says, "Poor husband's child, he's not to blame,
His father's folks are all the same."
Said the father at the end of the line,
"Why, I doubt the rascal's even mine!"

Rather than continue this litany of blame, U.S. business must seriously reconsider the meager two percent it annually invests in training and development. By comparison, Western European and Japanese businesses allocate four to five percent of their annual budgets to train-

ing and development. The National Association of Manufacturers and American Society for Training and Development estimate that, if we are to compete successfully on the international level, U.S. business must increase its formal annual training budget from the current $40 billion to $88 billion by the year 2000.

The Netherlands Foreign Investment Agency sends a compelling message to America's CEOs in a recent advertisement. It states:

> Holland's work force is one of its strongest business assets, embodying an extraordinary combination of language and technical skills, know how, discipline, work ethic and "can do" attitude. We have about the highest productivity as measured by relative unit labor costs in manufacturing in the EC. The Dutch people are seen as the most outwardly oriented and multi-lingual of Europeans. English is virtually a second language. Government policy and spending forge strong links between education and industry. Thirteen universities and more than 100 technical institutes train the management and staff you need in Computer Implemented Manufacturing, telecom, biotech, med-tech, information processing, office automation, software and micro-electronics.

This forceful statement by one of the smaller members of the European Community (EC) constitutes a direct challenge to American business. This same challenge is coming from other nations in Europe and Asia. American business must meet the international Work Force Education challenge or face a grim future of declining market share, lower profits, and a lowered standard of living.

The international economic competition that now exists is in part the result of the global prosperity, which America helped to generate after World War II. The world today is more competitive, not because America has declined but because we succeeded. A world of competitors is a lot healthier than an economic empire of subjects. The recent demise of the Soviet empire has reinforced this lesson.

What, then, is to be done? The message to the education and business community is simply this: America's future prosperity rests upon quality education for all of its citizens. We no longer have any "dis-

posable" students or workers. Neither Japan nor Western Europe has any inherent technological or productivity advantage that cannot be matched or improved on by the United States. However, they earned their competitive edge by making sustained and significant investments in the education and training of *all* their workers.

The schools and business must join forces in developing a Work Force Education plan now that re-energizes America as a major competitor in the world economic arena.

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